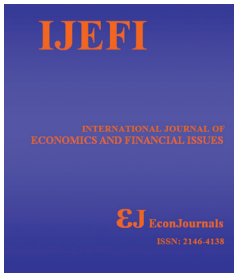

International Journal of Economics and Financial Issues

ISSN: 2146-4138

available at http: www.econjournals.com

International Journal of Economics and Financial Issues, 2024, 14(2), 45-53.

Navigating Financial Performance of the MENA Region Energy Sector: The Interplay of Working Capital and Leverage

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Received: 15 November 2023 **Accepted:** 16 February 2024 **DOI:** https://doi.org/10.32479/ijefi.15877

ABSTRACT

This research delves into the influence of leverage considering potential outcomes within operational funds concerning the fiscal implications of the energy industry within the Middle East and North Africa region. The research employed an empirical approach by collecting secondary data from the MENA region's energy sector between 2018 and 2022. To achieve this, the study formulated three hypotheses and utilized the empirical random panel data model. The investigative results affirm the validity of all three hypotheses. Additionally, they provide insights into the relationships among the variables in these hypotheses. Particularly noteworthy is the fact that certain results from the hypotheses contradict the expected theoretical impact. The article suggests that future researchers should delve into additional factors influencing firm performance, recognizing that diverse variables may yield varied outcomes. Broadening the study's scope by incorporating different timeframes and a more diverse array of firms could enhance the overall representativeness of research findings. Expanding this inquiry beyond the energy sector to encompass various industries might offer a comprehensive understanding of how working capital affects firm performance across distinct economic sectors. Subsequent empirical studies are advised to consider global health crises, political events, and other socio-economic developments in the MENA region. Examining events such as the COVID-19 pandemic and ongoing geopolitical conflicts like the Russian-Ukrainian and Israeli-Palestinian conflicts could illuminate how such incidents impact of the association among cash reserve, leverage, and company efficacy. To gain deeper insights into the causal distinctions among financial resources, and production form the company, researchers might investigate bidirectional results between each pair of variables using Granger causality tests. The findings from the present study are pertinent for energy sector companies, policymakers, and academia. Future research endeavors could focus on scrutinizing how the implications of operating funds on company procedures change when moderated by additional factors related to macroeconomics, providing practical insights for decision-makers.

Keywords: Cash from Operation, Fiscal Implications, Leverage, Moderator, MENA Areas Energy Sector, Random Panel Data Model
JEL Classifications: G20, G40, G41, G51, G53

1. INTRODUCTION

Capital or funds are essential for the seamless operation of business organizations. These resources are sourced both internally and externally. They serve two primary purposes: Firstly, for initiating or expanding a business, and secondly, for supporting its day-to-day operations. Establishing a business typically requires a 1-time investment, while expansions necessitate funds based on the need to enhance capacity or incorporate advanced technology. The capital utilized in setting up a business is referred to as fixed capital, while the funds utilized for ongoing operational activities are termed as working capital. Working capital leverages fixed investments or assets to ensure the smooth operation of a business.

A company's financial performance is assessed through metrics such as profit, profitability, and financial stability. Financial stability reflects a company's capacity to fulfill its both immediate and distant future obligations. Cash from operation, defined

as the discrepancy among the firm's existing obligations and assets, holds substantial influence on a business's operational capabilities. Sufficient availability of working capital ensures smooth operations, and its absence, while not directly affecting profit, can impede operational efficiency. Inadequate working capital may disrupt operations, resulting in temporary reductions in business profits. Hence, establishing the outstanding quantity of operating funds serves as vital at enhancing both profit and profitability.

Over the past century, oil has profoundly shaped various aspects of our daily lives, playing a pivotal role in shaping the global economy and society. It has been a catalyst for economic growth and the advancement of societies worldwide. Nowhere the impact added a conspicuous as compared to the MENA area. This geographic area holds approximately fifty percent of the globe's confirmed oil petroleum and natural gas storage, and the domicile of few foremost exposing oil and gas nations. However, its distribution of reserves of hydrocarbons in the sector is unevenly spread regionally, leading to the division among countries abundant in oil and gas and those lacking these resources. Consequently, the MENA region encompasses both nations that function as net exporters and those operating as net importers of energy (Hafner et al., 2023).

The United Arab Emirates (UAE) holds a significant position as a major producer of oil and gas, with substantial reserves primarily situated in Abu Dhabi. As a member of OPEC, the UAE heavily depends on crude oil production for export, particularly to Asian markets. In recent years, the country's energy landscape has been undergoing a shift towards an increased emphasis on natural gas, accompanied by initiatives to diversify into sustainable power sources for instance solar and nuclear energy. The UAE encounters challenges stemming from a surge in domestic energy demand and geopolitical tensions impacting its gas imports, notably through the Dolphin pipeline from Qatar. Despite ongoing plans for energy diversification, the UAE is actively working to secure its energy future by swiftly advancing new projects in the realms of gas, renewables, and nuclear energy before critical contracts expire (Hafner et al., 2023).

Saudi Arabia holds the title of the world's largest exporter of petroleum products, making a substantial contribution of 46% to its GDP (Investopedia, 2020; Trading Economics, 2022). Despite the downward trend in oil product prices observed over the past two decades, the Saudi economy remains heavily dependent on oil revenue, exerting a significant impact (Al Rasasi et al., 2019; Alharbi, 2020). The country's fiscal framework and gross domestic product are intricately linked to the unpredictable fluctuations in petroleum product prices, which are influenced by a variety of uncontrollable factors (Abdel-Latif et al., 2018).

Egypt boasts a longstanding history as an oil producer dating back to the late 1800s, with a primary focus on regions such as the Western Desert and Gulf of Suez. The country has undergone a notable transition rather than providing a barrier oil exporter to an vendor as returning again an exporter over the years, encountering challenges such as declining production and escalating domestic consumption. In a parallel development, natural gas assumed significant importance in the mid-1990s as a response to diminishing oil production. Egypt witnessed substantial gas discoveries but grappled with sustaining high production levels, a challenge exacerbated by political unrest. To meet domestic demand, Egypt shifted from gas exports to imports but eventually regained momentum with substantial offshore discoveries. Despite ranking as a leading oil and gas consumer in Africa, Egypt confronts challenges stemming from population growth, economic expansion, high energy subsidies, and low efficiency. In addressing these issues, Egypt is strategically incorporating renewable energy and has outlined targets in its "Integrated Sustainable Energy Strategy to 2035" (Hafner et al., 2023).

The profitability among the amount of power sector within MENA sectors, particularly in UAE, KSA, as well as Egypt, is influenced by various factors, necessitating a thorough investigation. Within these factors, working capital stands out as a pivotal element that significantly affects both the profit margins and the internal operational efficiency of energy firms.

2. LITERATURE REVIEW

2.1. Literature Regarding Determinants on Company Performance

Multiple factors, including the management of working capital, governance practices, economic conditions, and financial approaches, combine to impact a company's success across diverse industries and geographic regions. This convergence can be organized and illustrated in the following manner:

2.1.1. Working capital

Shaik (2021) emphasized a positive correlation between cash of operation and effectiveness within Saudi Arabian business. Likewise, Tanveer et al. (2016) showed that liquidity significantly affects company's economical health that is listed on the Karachi Stock Exchange.

2.1.2. Company size

Aljaaidi and Hassan (2020) uncovered a beneficial connection amongst board sizes and business outcome in Saudi Arabia. Additionally, Shaik (2021) observed that larger companies tend to be more profitable.

2.1.3. Financial strategies

Zimon (2019) discovered that Polish energy companies depended on external assets and suppliers for operational capital. Likewise, Alsharif and Tong (2020) highlighted the significance renewable resources in enhancing a fiscal performance of energy companies in Saudi Arabia.

2.1.4. Governance

Hamdan et al. (2017) underscored a positive impact of firms responsibility on how intellectual capital and business achievement are related.

2.1.5. Industry-specific findings

Ali and Alam (2021) identified variations in profitability among companies in Saudi Arabia's power industry. Similarly, Almomani et al. (2021) observed the impact of specific monetary ratios on the fiscal outcome of manufacturing companies.

2.1.6. Economic factors

Kiptoo (2017) proposed that making adjustments to payment schedules and exchange of currencies periods could exert a beneficial effect on a company's monetary outcome. Likewise, Akinwale (2018) prospect the connection among economic growth, technological invention, and energy consumption in Saudi Arabia.

2.1.7. Financial ratios

Rehman et al. (2015) established connections between specific financial ratios and Return on Assets (ROA) for firms that have been included on the Saudi Arabian security exchange, underscoring the importance of these ratios in determining company performance. Recognizing these relationships highlights that factors like working capital management, governance, economic conditions, and financial strategies collectively contribute to influencing a company's performance across diverse industries and geographical locations. Grasping these interrelated aspects offers a comprehensive perspective on the factors that shape business outcomes.

2.2. Literature about the Operational Budget Effect (WC) Upon Business Result

Effective Working Capital Management (WCM) is vital for organizations to uphold a designated level of Working Capital (WC). Nyeadi et al. (2018) observed that WC lacks precise hypotheses that illustrate its implementation relationship but capable comprehended within the theoretical framework of capital structure. Sustaining an optimal WC level is crucial for risk mitigation. However, this section concentrates on a literature review concerning firm performance in connection with WC.

Brigham and Ehrhardt (2013) delineated four fundamental components of Working Capital Management (WCM): Average Collection Period, Average Payment Period, Inventory Conversion Period, and Cash Conversion Cycle. The process of monetary transfer has conventionally served as an indicator employed by various authors to assess WC's impact on firm performance (Baños-Caballero et al., 2012; Pham et al., 2020; Tahir and Anuar 2016). Several studies presented divergent findings concerning the influence of WC on firm performance. For example, while Altaf (2020), Sharma et al. (2020), and Gill et al. (2010) uncovered a beneficial correlation among liquidity and business success, Akgün and Memiş Karataş (2021), Fernández-López et al. (2020) identified an adverse effect. Consequently, these disparate outcomes prompt further investigation into the connection within WC and company efficiency within the background of energy organization. To the extent of our understanding, this study represents the inaugural attempt to empirically analyze the relationship between firm performance and WC in the MENA region energy region.

Several scholars integrated a controlling factor to discern the underlying impact of Working Capital (WC) on firm performance. Saini and Singhania (2018) and Fernández-López et al. (2020) discovered that leverage has an adverse effect on firm performance. In contrast, Altaf (2020) observed a favorable connection between business success and debt. Saini and Singhania (2018) also unveiled a positive correlation between firm size and firm performance, a result supported by Fernández-López et al. (2020), Gharaibeh and Khaled (2020), and Chandrapala and Knápková (2013), indicating larger organization tend to outperform smaller ones. Altaf (2020) identified a beneficial effect of the current ratio on firm performance.

The main goal of the research is to empirically investigate the impact of operational fund on firm performance. Recognizing the crucial role that working capital plays for all firms, as its neglect may significantly impact firm performance and viability, we have introduced another independent variable, namely leverage. Additionally, our current study incorporates a control variable-firm size-to explore its potential impact on firm performance. Lastly, we employ moderation (interaction) by multiplying the two independent variables-working capital and leverage-to enhance the robustness of our results. As a result, the three hypotheses of this study can be formulated as follows:

H1: There is a considerable influence of working capital upon business effectiveness.
H2: There is a considerable influence of leverage upon business effectiveness.
H3: Leverage moderates the effect of liquidity on business output.

3. METHODOLOGY

3.1. Analytical Framework

Panel data refers to information that encompasses observations of various events recorded across several time periods intervals with an identical set of individuals, items, or units. In essence, within the field of econometrics, panel data represents multi-dimensional data collected over a specific duration. Conversely, panel data analysis is a technique in statistics. Widely employed across various fields such as social sciences and econometrics to examine information collected over multiple periods for the same individuals or entities (Adefemi, 2017). This research involves an empirical investigation utilizing secondary panel data collected between 2018 and 2022, employing three statistical procedures: descriptive analyses, panel data unit-root (stationarity) tests, and panel data regression analysis.

3.1.1. Descriptive analysis

Analytical description serves the purpose of revealing the characteristics or distribution of sample or population data by utilizing observed data from tables, frequency distributions, graphs, diagrams, pictograms, medians, means, and variations among groups through standard ranges and deviations (Anggraeni et al., 2021).

3.1.2. Panel data regression analysis

A basic panel data regression model can be expressed as follows (Adefemi, 2017):

$$Y_{it}=\alpha+\beta X_{it}+\varepsilon_{it}$$

Y: Represents the dependent variable
X: Stands for the independent or explanatory variable
A and β: Denote the coefficients
I and t: Are indices referring to individuals and time
ε: Signifies the error term

In panel data regression analysis, there are primarily three approaches utilized (Adefemi, 2017):

1. Independently Pooled Ordinary Least Squares (OLS) regression model.
2. Fixed effects model.
3. Random effects model.

3.1.2.1. Independently pooled ordinary least squares regression model

This model is considered one of the simplest forms of cross-sectionally built time series models, where the regression coefficients remain constant across all time periods and for all units within the cross-section. It is reliant on the assumptions of the normal multiple linear regression model and is computed using the ordinary least squares (OLS) approach (Ramadan, 2017). Essentially, this model assumes a standard regression scenario without any time-series data for the cross-sectional units. Consequently, the results generated from this model are expected to be less precise and more prone to bias.

3.1.2.2. Fixed effects model

This type of model, known as a fixed effects model, permits difference or distinct characteristics across diverse intersections, making it possible for each cross-sectional to be distinct its unique intercept (Amer, 2015). Essentially, while the intercept may vary across cross-sections, it remains constant over time. In a fixed effects model, the error component is perceived to fluctuate non-stochastically across each entity and time. Certain individual characteristics remain constant over time and are associated with independent factors. To sum up, in a fixed effects model, the model's parameters are considered a substitute, and collective signify remain constant. Dummy variables can be employed to compute the fixed effect model.

3.1.2.3. Random effects model

While the fixed effects-built model assumes that the differences in the fixed intercept values (the regression's constant parameter) among cross-sectional units, the random effects model incorporates these differences within the error term, resulting in a transformed error term or random error, introducing new hypotheses (Amer, 2015). To clarify, the random effects model treats the variations among cross-sectional units and time periods as random attributes rather than fixed ones. This assumption is grounded on the idea that the sample utilized in the analysis is randomly selected. Consequently, the regression model parameters reflect the entire sample and include variations associated with cross-sectional units and time periods within the random error term.

The comparison among the three models is conducted through a set of tests utilized by various studies (Ramadan, 2017; Akbar et al., 2011; Le, 2015; Baltagi, 2014) and includes the following methodologies:

1. Correlated Random Effects-Hausman test:

The test aims to describe the suitable model contrasting random and steady effects models.

- Hypothesis

H0: The random effects-built model is the most adequate.
H1: The fixed effects-built model is the most adequate.

- Decision Criterion

Refute the null hypothesis (H0) when the probability value falls below 5%; Embrace H0 when the probability value surpasses 5%.

2. Wald test

If we assume that the Fixed Effects model is considered appropriate, the Wald test is utilized to ascertain the preferable model between the Fixed Effects model and the Pooled Ordinary Least Squares (OLS) regression model.

- Hypothesis

H0: The Pooled-built OLS regression model is acceptable (All dummy variables equal zero).
H1: The Fixed Effects-built model is acceptable (At least one dummy variable does not equal zero).

- Decision criterion

Reject the null hypothesis (H0) if the probability value from the Wald test is less than 5%; accept H0 if the probability value from the Wald test is greater than 5%.

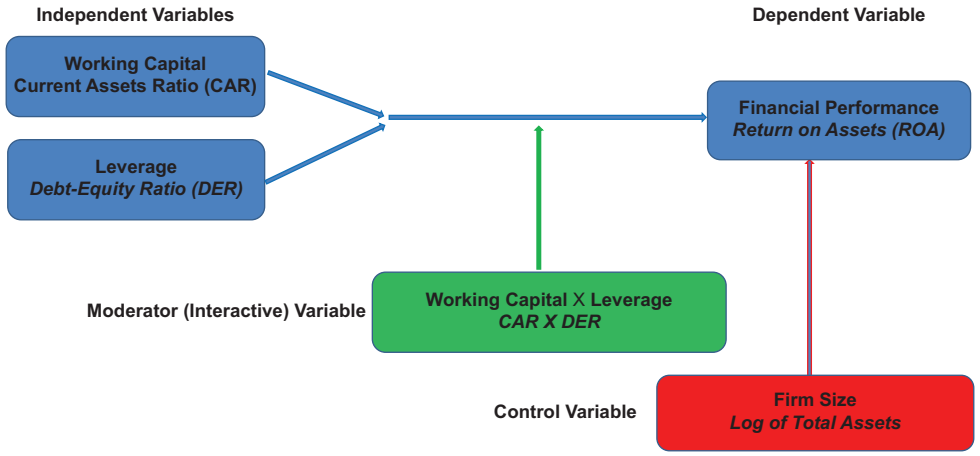
Figure 1 depicts the primary empirical model utilized to examine the hypotheses in this study, displayed as follows:

3.2. Data and Sample Selection

The study aims to analyze enterprise in the energy related sector that are listed on Stock Exchanges in the MENA region. The sampled population for this research includes these companies, categorized into three sub-regions: The Arabian-Persian Gulf (comprising the six Gulf Cooperation Council countries plus Iran), the Mashreq (covering Egypt, Iraq, Israel, Jordan, Lebanon, Palestine, Syria), and the Maghreb (encompassing Algeria, Libya, Morocco, Tunisia) regions (Hafner et al., 2023).

For hypothesis testing, data from fourteen companies in the United Arab Emirates (UAE), Kingdom of Saudi Arabia (KSA), and Arab Republic of Egypt were employed, spanning the period from 2018 to 2022.These countries were chosen to represent the MENA region's Energy sector, as they collectively account for half of the anticipated investments in the region's power sector. The MENA region is estimated to require 88GW of generation capacity from

Figure 1: The general empirical model



Source: prepared by the researchers

2019 to 2023, translating to roughly USD 142 billion for generation and about USD 68 billion for transmission and distribution (T&D). Presently, around 87GW of generation capacity is in progress, with 74GW expected to be operational within the next five years. The UAE leads this development (19%), followed by Saudi Arabia (17%) and Egypt (16%) (www.apicorp.org).

To ensure data availability, the study focuses on these fourteen specific companies: UAE (TAQA, ADNOC, BOROUGE, and DANA-GAZ), KSA (BAHRI, SAUDI ARAMCO, ACWA-POWER, MAADEN, MARAFIQ, and SABIC), and Egypt (National Drilling Company, MARIDIVE, EGAS, and Trans Globe). Annual panel data series were constructed using financial statements that were obtained from the Bloomberg database.

The research assesses company results using Return on Assets (ROA) as the dependent variable. The independent variables comprise the Current Assets Ratio (CAR) for evaluating working capital, the Debt-Equity Ratio (DER) for gauging leverage, and an interactive variable (CAR × DER) to further investigate the impact of working capital in relation to the Debt-Equity Ratio. Additionally, firm size acts as a control variable. Net Income before taxes divided by the total value of assets is known as ROA., CAR is represented by current assets divided by current liabilities, and DER is total debt divided by total equity. The factors of association reflect the interplay between CAR and DER, while the control variable is firm size measured by the logarithm of total assets (Shaik et al., 2023).

4. RESULTS

4.1. Descriptive Analysis

In Panel A of Table 1, the descriptive statistics reveal the following insights regarding the measures of the ROA dependent variable and other related variables: For the ROA dependent variable, the maximum value is 0.309005%, the minimum is −0.15524%, the mean is 0.050028%, the median is 0.031178%, and the standard deviation is 0.087134%. Regarding the current-assets ratio, its values range from 0.306297% to 8.184626%. The mean is 2.027267%, the median is 1.661782%, and the standard deviation is 1.47853%. Concerning the debt-equity ratio, the maximum value observed is 19.3964%, the minimum is -9.91814%, the mean is 1.544725%, the median is 1.147733%, and the standard deviation is 2.902571%. The moderator (interacting) variable CAR*DER varies between −3.0379% and 9.01921%. Its mean is 2.177847%, the median is 1.793438%, and the standard deviation is 1.777563%. Regarding the control variable firm size, it ranges between 1.542825% and 6.396709%. The mean value is 4.29184%, the median is 4.365531%, and the standard deviation is 1.102277%.

In Panel B of Table 1, the contemporaneous bivariate correlations among the variables utilized in the analysis are presented. Initially, the correlations between each independent variable and the dependent variable are all below 0.80. This suggests the absence of multicollinearity among these variables (Gujarati, 2003). Notably, the correlations exhibit varying signs between the analyzed variables, which might align or deviate from the anticipated direction based on existing theories and literature. However, it's important to emphasize that correlation merely indicates a linear relationship between two variables and does not imply causation or impact (Ratner, 2009). Hence, our attention shifts to the regression coefficients within our employed regression model to accurately demonstrate the directional impacts of the results.

4.2. Panel Data Regression Analysis

To examine the impact of working capital on the performance of energy companies in the MENA region, this study employs panel regression models, utilizing pooled, fixed, and random- built effects approaches. The specifics of the estimated models are outlined below:

4.2.1. Pooled effects

$$ROA_{i,t}=\alpha+\beta1CAR_{i,t}+\beta2FS_{i,t}+\varepsilon_{i,t} \quad (1)$$

$$ROA_{i,t}=\alpha+\beta1CAR_{i,t}+\beta2DER_{i,t}+\beta3FS_{i,t}+\varepsilon_{i,t} \quad (2)$$

$$ROA_{i,t}=\alpha+\beta1CAR_{i,t}+\beta2DER_{i,t}+\beta3CAR\times DER_{i,t}+\beta4FS_{i,t}+\varepsilon_{i,t} \quad (3)$$

4.2.2. Fixed effects

$$ROA_{i,t}=\alpha+\beta1CAR_{i,t}+\beta2FS_{i,t}+\varepsilon_{i,t} \quad (4)$$

$$ROA_{i,t}=\alpha+\beta1CAR_{i,t}+\beta2DER_{i,t}+\beta3FS_{i,t}+\varepsilon_{i,t} \quad (5)$$

$$ROA_{i,t}=\alpha+\beta1CAR_{i,t}+\beta2DERi,t+\beta3CAR\times DER_{i,t}+\beta4FS_{i,t}+\varepsilon_{i,t} \quad (6)$$

4.2.3. Random effects

$$ROA_{i,t}=\alpha+\beta1CAR_{i,t}+\beta2FS_{i,t}+\mu_i+\varepsilon_{i,t} \quad (7)$$

$$ROA_{i,t}=\alpha+\beta1CAR_{i,t}+\beta2DER_{i,t}+\beta3FS_{i,t}+\mu_i+\varepsilon_{i,t} \quad (8)$$

$$ROA_{i,t}=\alpha+\beta1CAR_{i,t}+\beta2DER_{i,t}+\beta3CAR\times DER_{i,t}+\beta4FS_{i,t}+\mu i+\varepsilon_{i,t} \quad (9)$$

In this context, α signifies a fixed value, whereas β1 through β4 represent the coefficients allocated to different study variables, and μ indicates the residual term in the context of a random effects model.

Table 2 displays the outcome of Model 1, indicating that the primary influencer of ROA, specifically, working capital, consistently exhibits a negative and significant impact across all three sub-models. The model is deemed appropriate with an adjusted R-squared of 32%, and the F-statistic is significant at a significance level of <1%.

In Table 3, presenting Model 2, both working capital and leverage demonstrate a negative and significant correlation at a 0% significance level. The independent variables in this model result in an adjusted R-squared of 92%, signifying a substantial explanatory power for the firm performance variable. Additionally, the F-statistic is significant at a significance level of less than 0%, indicating a robust fit for the model.

Table 4 illustrates Model 3, where both working capital and leverage show a negative and statistically significant impact at a 0% significance level. Furthermore, the interaction variable (CAR×DER) displays a positive and significant association at a 0% significance level. The independent variables collectively yield an adjusted R-squared of 100%, indicating a thorough explanation of the firm performance variable. The F-statistic is significant at a significance level of <0%, signifying a strong fit for the model.

The results from the Hausman test suggest a preference for panel random effects over fixed effects across all three models. Consequently, the pooled effects models are excluded from consideration.

5. DISCUSSION

The present research investigates the connection amosng working capital and organization profitability, considering the moderating impact of leverage. The findings reveal a significant negative influence of working capital on business performance, suggesting that the effective management of a company's working capital may not be pivotal for attaining financial goals like maximizing wealth and income. This observation aligns with existing literature (Akgün and Memiş Karataş, 2021; and Fernández-López et al., 2020). We posit that proficient working capital management could lead to improved profits over the extended term. However, the study's timeframe, spanning from 2018 to 2022, might be too brief to capture these prolonged effects, contributing to this divergent result.

Additionally, the research unveils a predominantly negative and significant the effect of debt on business profitability. This insight aligns with the notion that long-term debt typically elevates the cost of debt, thereby reducing a firm's profitability. These results are in harmony with prior investigations by Ahmad et al. (2015), Mukras (2015), Javed (2015), Ilyukhin (2015), Singh and Bansal (2016), Dalci (2018), and Daryanto et al. (2018).

Moreover, the moderating effect of debt financing in relation to efficiency and operational resources yields an intriguing outcome-a positive and significant impact. This positive effect could be attributed to the heightened influence of debt on working capital.

The adverse effect of debt on profitability may be attributed to a preference for long-term funding options with elevated costs or frequent dependence on short-term borrowing. Particularly, the MENA region, acknowledged as a global leader in the energy sector, demonstrates divergent outcomes, potentially stemming from the widespread utilization of short-term debt by other energy firms. These moderation findings resonate with prior studies conducted by Baños-Caballero et al. (2014) and Mahmood et al. (2019), emphasizing a U-shaped association between working capital financing and profitability.

Table 1: Describing research variables

Panel A: Descriptive statistics					
	ROA	Current Assets Ratio	Debt-Equity Ratio	CAR*DER	Size
Mean	0.050028	2.027267	1.544725	2.177847	4.29184
Median	0.031178	1.661782	1.147733	1.793438	4.365531
Standard deviation	0.087134	1.47853	2.902571	1.777563	1.102277
Minimum	−0.15524	0.306297	−9.91814	−3.0379	1.542825
Maximum	0.309005	8.184626	19.3964	9.01921	6.396709
Panel B: Correlations matrix					
ROA	1				
Current assets ratio	0.149881	1			
Debt-equity ratio	−0.08166	−0.22555	1		
CAR*DER	0.065307	−0.05733	0.701396	1	
Size	0.449179	−0.22634	−0.0359	−0.05798	1

Table 2: Panel data regression analysis (Model 1)

Variables/tests	Random Effects			Fixed Effects			Pooled Effects		
	Coefficient	T	Sig. T	Coefficient	T	Sig. T	Coefficient	T	Sig. T
C	0.675786	4.940137	0.000	0.675786	4.940137	0.000	0.675786	9.672246	0.000
Current Assets Ratio	−0.092957	−3.45017	0.001	−0.092957	−3.45017	0.001	−0.092957	−6.75506	0.000
Size	−0.108531	−4.88732	0.000	−0.108531	−4.88732	0.000	−0.108531	−9.56884	0.000
R^2		0.340293			0.340293			0.340293	
Adjusted R^2		0.320600			0.157041			0.333919	
F		17.28009			1.856965			53.38774	
Sig. F		0.000			0.049830			0.000	
Sig. Hausman test					1.0000				
Appr. Model	Random Effects Model								

Source: EViews 13 Depending upon Equations (1), (4), and (7)

Table 3: Panel data regression analysis (Model 2)

Variables/tests	Random Effects			Fixed Effects			Pooled Effects		
	Coefficient	T	Sig. T	Coefficient	T	Sig. T	Coefficient	T	Sig. T
C	0.483405	10.38024	0.000	0.483405	10.38024	0.000	0.483405	23.68775	0.000
Current Assets Ratio	−0.04598	−4.96154	0.000	−0.045988	−4.96154	0.000	−0.045988	−11.3222	0.000
Debt-Equity Ratio	−0.00553	−20.7868	0.000	−0.005536	−20.7868	0.000	−0.005536	−47.4357	0.000
Size	−0.07681	−10.1547	0.000	−0.076817	−10.1547	0.000	−0.076817	−23.1732	0.000
R^2		0.927922			0.927922			0.927922	
Adjusted R^2		0.924646			0.906163			0.927139	
F		283.2261			42.64483			1184.400	
Sig. F		0.000			0.000			0.000	
Sig. Hausman test					1.0000				
Appr. Model	Random Effects Model								

Source: EViews 13 Depending upon Equations (2), (5), and (8)

Table 4: Panel data regression analysis (Model 3)

Variables/tests	Random Effects			Fixed Effects			Pooled Effects		
	Coefficient	T	Sig. T	Coefficient	T	Sig. T	Coefficient	T	Sig. T
C	0.918457	1.85E+12	0.000	0.918457	1.85E+12	0.000	0.918457	4.35E+11	0.000
Current Assets Ratio	−0.26966	−−1.28E+12	0.000	−0.269662	−1.28E+12	0.000	−0.269662	−3.02E+11	0.000
Debt-Equity Ratio	−0.20051	−1.14E+12	0.000	−0.200518	−1.14E+12	0.000	−0.200518	−2.69E+11	0.000
CAR × DER	0.179274	1.11E+12	0.000	0.179274	1.11E+12	0.000	0.179274	2.61E+11	0.000
Size	−0.11129	−1.90E+12	0.000	−0.111299	−1.90E+12	0.000	−0.111299	−4.48E+11	0.000
R^2		1			1			1	
Adjusted R^2		1			1			1	
F		5.36E+24			1.01E+24			2.37E+23	
Sig. F		0.000			0.000			0.000	
Sig. Hausman test					1.0000				
Appr. Model	Random Effects Model								

Source: EViews 13 Depending upon Equations (3), (6), and (9)

6. CONCLUSIONS

Considering the evaluation and debate of the results, the conclusions drawn from this study are as follows:

1. Significant Negative Impact of Working Capital on Firm Performance: The research highlights a significant adverse effect of liquidity on the productivity of a business. This implies that the administration of working capital may not be aligned with the improvement of overall business performance.
2. Significant Negative Impact of Leverage on Firm Performance: Another key discovery from the study is the detrimental impact of leverage on firm performance. This suggests that the utilization of leverage, particularly long-term debt, tends to reduce a firm's overall profitability.
3. Leverage Moderates a U-Shaped Impact of Working Capital on Firm Performance: The study uncovers that leverage acts as a moderating factor in the correlation between working capital and firm performance, leading to a U-shaped impact. This suggests that the interaction among operating capital and leverage is not straightforward but instead follows a U-shaped pattern in terms of its impact on firm performance.

7. SUGGESTIONS

In future studies, researchers could consider several avenues to expand upon the findings of this study:

1. Exploring Various Performance Determinants: Future research might investigate additional determinants of firm performance, as different variables could yield diverse findings. Including different time periods and a broader range of firms in the sample could enhance the representativeness of research outcomes.

2. Diversifying Industry Focus: Researchers may extend this study beyond the energy sector to other industries. Examining diverse sectors could offer a comprehensive understanding of how working capital impacts firm performance across different economic sectors.
3. Considering External Factors: Subsequent empirical investigations could consider global health crises, political occurrences, and other socio-economic developments in the MENA region. Integrating events such as the COVID-19 pandemic crisis and the ongoing Russian-Ukrainian and Israeli-Palestinian conflicts into analyses might unveil the impact of such occurrences on the correlation between working capital, leverage, and firm performance
4. Bidirectional Effects Investigation: Examining bidirectional effects between each pair of variables individually through Granger causality tests could offer valuable insights into the causal relationships between working capital, leverage, and firm performance.
5. Practical Implications and Target Audience: The current study's findings could be valuable to energy sector companies, policymakers, and academia. Future research might focus on examining how working capital's impact on firm performance changes when moderated by other macroeconomic variables, offering practical insights for decision-makers.

By exploring these avenues in future research, scholars can further deepen their understanding of how working capital and leverage interact to shape firm performance across different contexts and periods, offering valuable insights for businesses and policymakers.

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